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TORRANCE

FAST DISASTER CASE STUDY | GROUP 12

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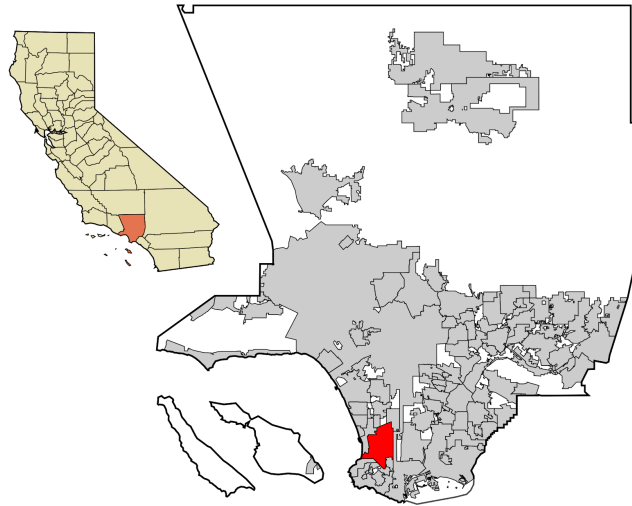
Lafayette Pierre White

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¹ A total of eight students contributed to this case study, some of whom chose to be anonymous

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Relief location map of the USA (without Hawaii and Alaska).*Wikipedia*, licensed under CC BY 3.0. Retrieved October 25, 2019, from https://en.wikipedia.org/wiki/Torrance,_California#/media/File:Usa_edcp_relief_location_map.png

1. What is the setting of this case? [Parmida]

Torrance, CA is located in south western Los Angeles County, bounded by the Pacific Ocean on the west. It covers about 21 square miles and has 1.5 miles of life guarded-patrolled beach which is called Madrona Marsh, bath-housed Facilities and public parking. The population is 145,182 since July 1, 2018 as recorded in U.S Census which is 7102 people per square mile, and is the 8th largest city in the LA county. It has few refinery plants that are about 1 to 5 miles away from schools and parks, across from the residents of Torrance.

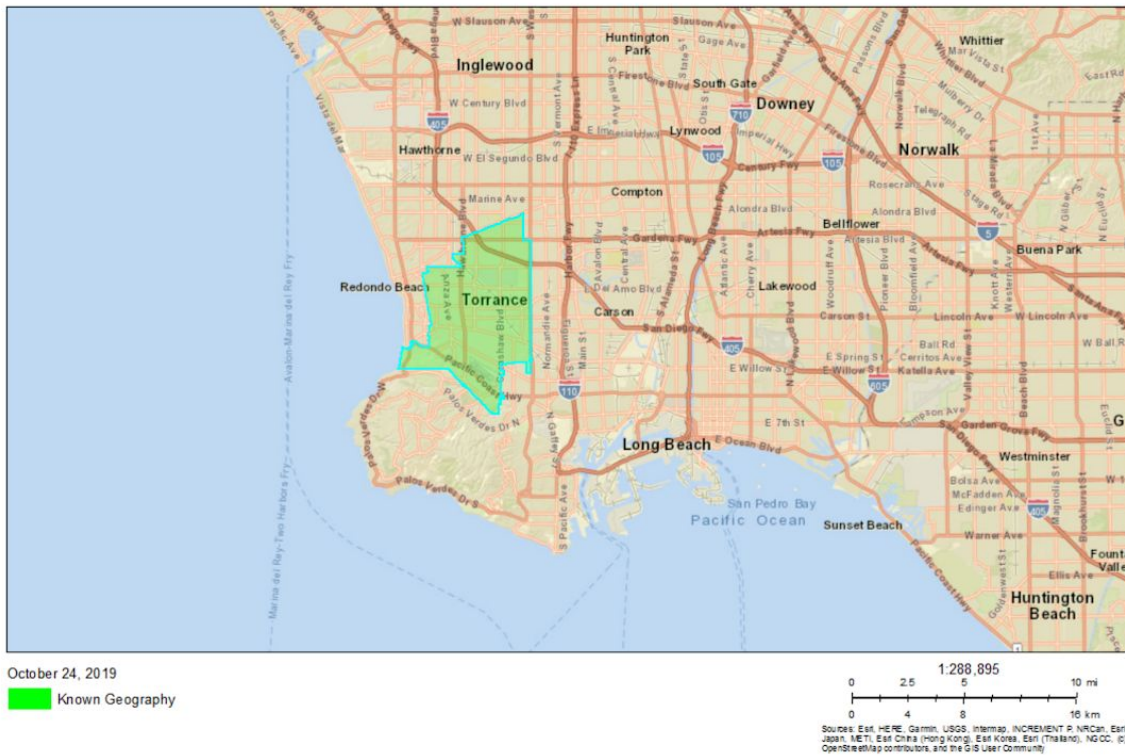


Fig. 1: Selected area for the City of Torrance. EPA EJScreen Report, *City of Torrance*, 2018. Population is 147,307 and input area is 20.55 square miles. Retrieved October 24, 2019. Screenshot taken by author.

The city of Torrance has a very large Asian population, as 35.4% of the residents are Asian only, compared to the 5.9% total Asian only residents in all of the US. According to demographic indicator (fig.2), the minority of Torrance is less than 50 percentile compare to the state percentile. The median gross rent is \$1,582 and median value of owner-occupied housing unit is \$687,900 between 2013 to 2017. The median household income is \$85,070 in 2017 dollars and unfortunately 7.2% of the people are living in poverty. According to public health database, 17% people are under 65 years and are without health insurance and 4.9% of people who are under 65 years have disabilities. Also, 6% of children, 17 years and younger, are diagnosed with asthma in Torrance compared with 3% in Best performing city or community. There are 1,154 of oil and gas wells in Torrance. According to Torrance, Ca government web page “The City has Council/Manager form of government. The City Council is the elected body, which adopts legislation, sets policy, adjudicates issues and establishes the budget of the City. The City Manager administers policy set by the City Council and oversees day-to-day operations of the City” (Torranceca 2019). The Council members serve 4 years per term with a limit of 2 consecutive terms,

having to take a break of 4 years before being able to run for office again. About 10% of the population is linguistically isolated, which is in the 86th USA percentile as it shown in demographic indicator (fig. 2).

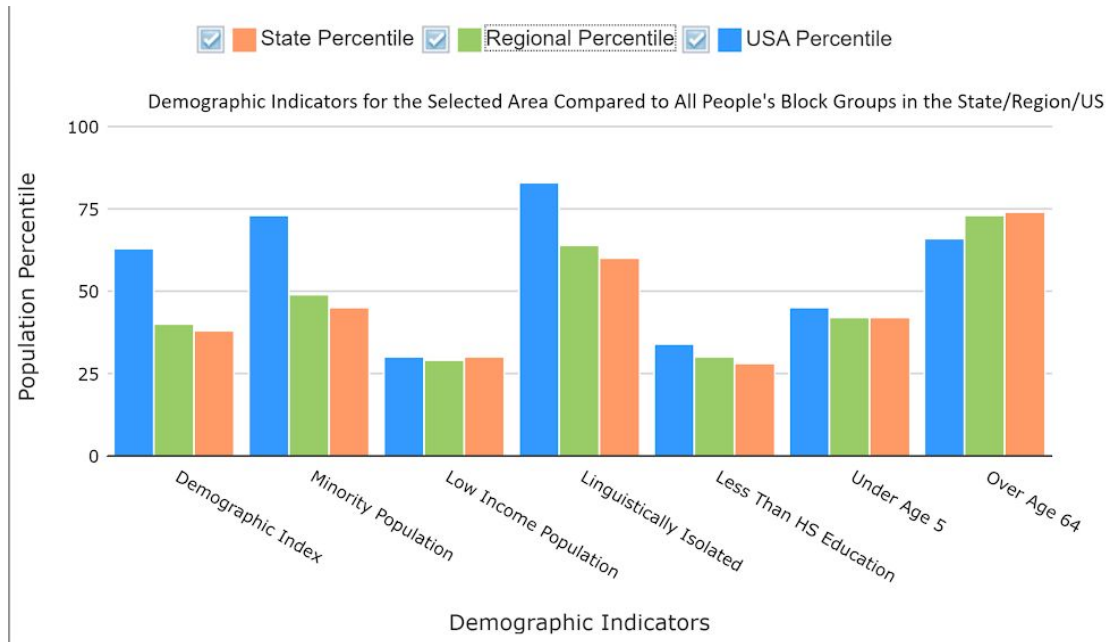


Fig 2: Demographic indicators for City of Torrance. EPA EJScreen Report, City of Torrance, 2018. Retrieved October 25, 2019. Screenshot taken by author.

The CalEnviroScreen 3.0 (Fig. 3) generated a map that showed several census tracts in Torrance that rank 81 and 100%. there are some parts of Torrance that is in 1 to 10% according to further points to several census tracts in Richmond that rank between 81 and 100% according to the CalEnviroScreen 3.0 indicators. The map illustrates the distribution and stratification of Torrance stressors.

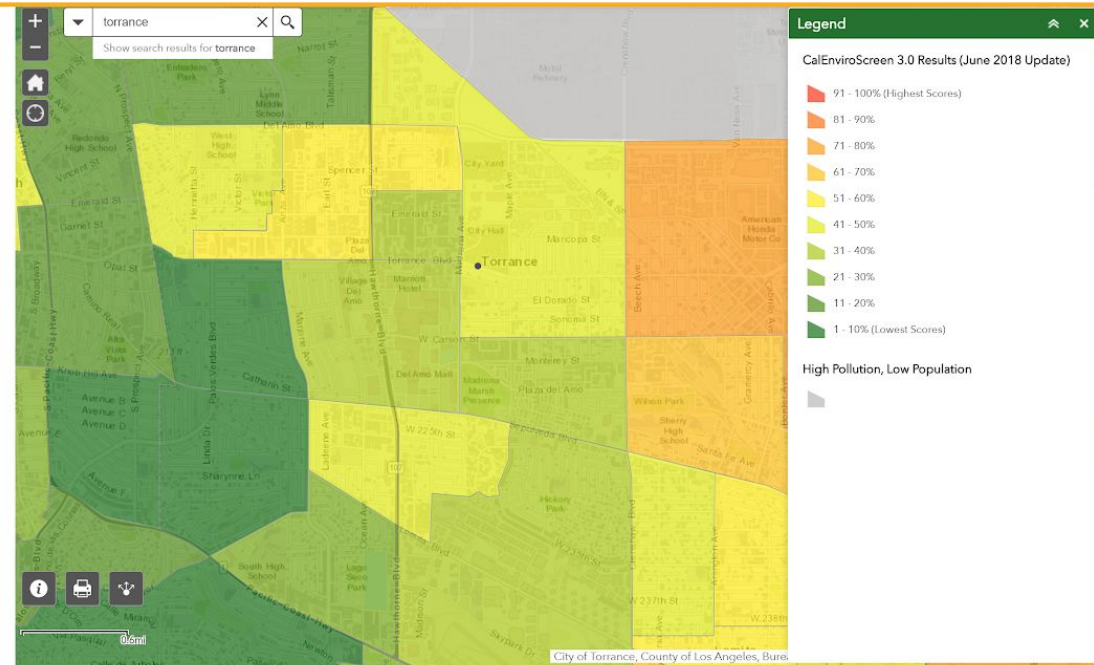


Fig 3: High scoring census tracts in Torrance, CalEnviroScreen 3.0, June 2019. Retrieved October 25, 2019. Screenshot taken by author.

Putting the demographic indicator and CalEnviroScreen 3.0 data together, it shows the city of Torrance has extremely high risk areas and then low risk areas. The majority of the city are minority residence and are vulnerable to the high risk factors like the refineries. This city is vulnerable to environmental injustice because the refineries are not fixing their safety issues and do not provide the residents the information about worst-case scenario and what the residence should do.

2. What environmental threats from worse case scenarios are there in this setting? What data is available to characterize worse case scenario potential? What other environmental hazards are there in this setting?

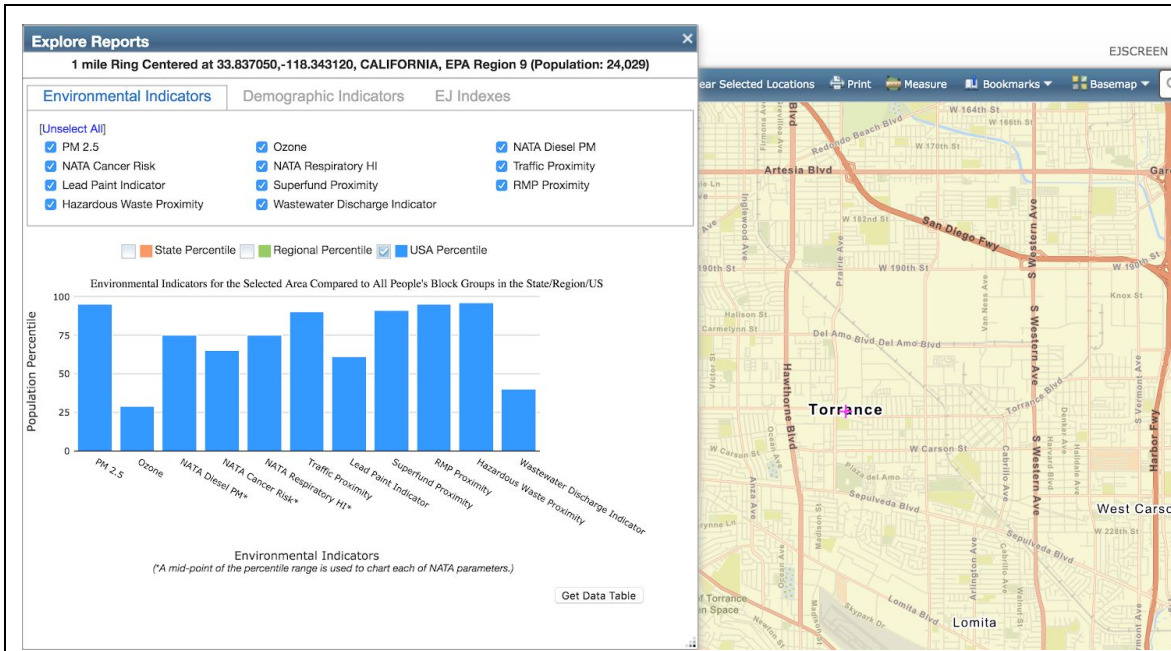


Fig 4: As seen above, on the EJ EPA indicator it can be seen that Torrance California Ranks in the highest percentile in PM 2.4 (Particulate matter), Hazardous Waste Proximity, and RMP Proximity. Also what can be seen are the neighborhoods that make up Torrance, California. As a result, a combination of these two factors together in the same city poses an environmental threat on all life nearby.

One of the largest threats in Torrance, California is the Torrance Refinery which covers 1.5 miles in the midst of a local neighborhood community. However yet the names of the hazardous waste that are produced there aren't made public, however, there have been reports on the chemicals that are stored there. It can be seen on the EJ screen reports on hazardous waste that torrance ranks in the 96th percentile, and given that the Torrance Refinery is the only major factory there producing waste, it can be identified as the main contributor to this. In addition, EJscreen reports that on the Particulate Matter 2.5 scale (EPA), Torrance ranks in the 95th percentile. Particulate matter has been studied continuously and has been understood to be linked to causing asthma and reduces lung growth in children (Green Facts 2003). On top of that, RMP proximity is ranked in the 91st percentile, meaning that there are plenty of chemicals that are held in the area that can cause an explosion (EPA). Torrance has already seen one of them.

In the past there have been many accidents. One of the well known accidents recently was in 2015 when pressured gas exploded on site at the refinery, large enough that it was recorded as a magnitude-1.7 tremor (Zou 2017). Exxon-Mobil gets blamed for Torrance oil refinery explosion by federal safety board. This explosion injured 4 people and threatened to release thousands of pounds of hydrofluoric acid in 2015. Some of the debris of this explosion released industrial material into the air, some of which weighed up to 40 tons. The explosion of the Exxon-Mobil refinery happened in the Fluid Catalytic cracking (FCC) unit. FCC is where a variety of products, mainly gasoline is produced. The U.S. chemical Safety Board (CSB) found many instances during work leading up to the explosion, the workers of the refinery violated corporate lock out tag out requirements. Therefore, the safety of the refinery was not up to standard and if they were then this incident could have been prevented as the U.S. Chemical Safety and Hazard Investigation Board stated. Unfortunately, Exxon-Mobil refused to provide the board with information about the facility safety. According to CSB, The incident caused the refinery to be run at limited capacity for over a year, raising gas prices in California and costing drivers in the state an estimated \$2.4 billion” (CSB 2017).

There will always be a probability for accidents in refinery factories. However what should really be considered is whether running the risk to put thousands of lives at danger, morally right.

3. What factors -- social, cultural, political, technological, ecological -- contribute to environmental health vulnerability and injustice in this setting? [Regan]

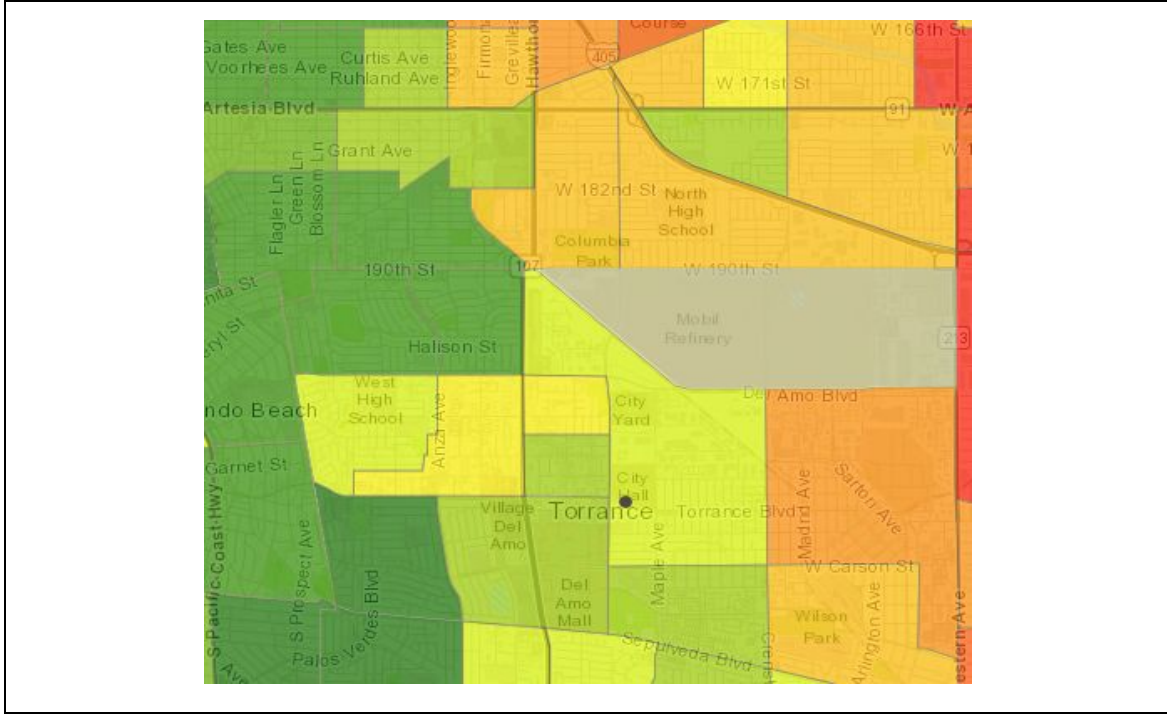


Fig. 5: The census tract lands North, parallel to the Mobil Refinery and stretches Eastward

The factors that contribute to environmental health vulnerability and injustice in the city of Torrance are economic inequality, education, and literacy. In Census Tract: 6037650200, which scored the highest with a “population burden of 95”(CES 2018), the statistics directed towards a connection between class and educational levels in an area affecting their higher risk vulnerability to health diseases/exposure. When compared to this area’s Western neighbors (Green areas with lowest scores), the area around North High school simply has a higher percentage in most of the categories, regarding to low levels of income and education. One interesting thing to point out is that there isn’t a racial issue occurring in the census tract chosen; It was balanced between Hispanic, Caucasian, and Asian American individuals.

It’s not difficult to speculate that lower class statuses are exposed to higher levels of chemical exposure, and even receiving the after effects of a refinery that polluted the soil/water. In this area of Torrance, there are spiked levels of Asthma and low

birth weight, which compared to the other tracts is fairly high. “Linguistic isolation” refers to how individuals carry language barriers that essentially cut them off from understanding the factual, important information about their community. Less education, as well, only leads to an uninterested population who don’t consider the factors that affect the air. Activist groups seem to be attempting to counter these types of conflicts by community outreach. There’s a trend of oil companies abusing the individuals that live in areas such a Torrance. For the most part, these companies will attempt to publicly fund programs and the community to gain a form of impunity from public criticism. In low income areas, many individuals who can’t communicate in english or constantly work because of their financial situation won’t be able to fight back against these abusive powers in Big oil. Many political figures in our government support a large number of companies that run refineries because of the profit greed, solely. This type of status allows companies like Exxon or Mobil to continue being profited, and only leads to the growth of more refineries.

4. Who are the stakeholders, what are their characteristics, and what are their perceptions of the problems? [Eric]



Fig 6: Residents of Torrance put up signs, supporting the ban of MHF.

The stakeholders in this issue include the oil companies’ corporate entities, their shareholders, protesters, and concerned citizen groups. The oil companies factions that have control over the oil refinery production and problems include the workers at the refineries, the refineries themselves, the shareholders of companies like

ExxonMobil, and the corporate entities of said companies. The refineries main desire is to stay in business and continue to produce refined oil at cheap prices. The corporate entities want to continue sending crude oil to the refineries to satisfy their shareholders. All of these stakeholders are invested in the monetary profit of the refinery, and are less interested in the health impacts, climate change impacts, and changes to the local environment.

On the other side of the issue are the local protesters, organizations like Communities for a Better Environment (CBE), and South Bay 350 LA. The locals work in and live around the refineries; many of them like Maureen Mauk and Catherine Leys have been actively protesting the refineries. Their efforts “managed to convince regulators to require the company to restart the refinery at night rather than when children were at school and give the community 48 hours notice, neither of which ExxonMobil had volunteered to do” (Green 2017). The two also formed the online group South Bay FLARE, an activist group dedicated to lobbying in favor of the public interest and checking corporate greed and pollution in Torrance. Now that social media is a massive source of news for many individuals, topics such as the Torrance community and environmental injustice pick up discussion and leads to exposure of the issue at hand. Other groups such as CBE take a higher level position, working through their local group STAND-LA, and supplying direction, national level petitions, and supporting legal action.

5. What have different stakeholder groups done (or not done) in response to the problems in this case?



Fig 7: Climate Protest against the continued use of MHF

The stakeholders in this case have been very active and have contributed to the case in many ways. Local environmental groups and protesters in particular have been actively protesting the continued use of MHF in the Torrance Refinery. Since the refinery was sold by ExxonMobil to PBF Energy in late 2015, a series of failures and problems led to “a Shelter-in-Place Order (an order for residents to stay indoors) which was issued as a result of several hours of flaring.” (Madrigal 2019). Continued protests due to these issues seem highly likely as little progress has been made to stop the oil companies. Torrance environmental groups have also invited other environmental groups from Wilmington to support them in a united ban of MHF, protecting them from the hazardous chemical used in both communities’ refineries. The oil companies on the other hand have increased their lobbying against the ban considerably, as a ban would result in a decrease in profits. PBF Energy in particular has nearly doubled their annual lobbying budget recently to combat the growing movement to ban MHF. PBF has also “mobilized its union work force to pack recent government meetings and argue against a ban” (Green 2018). The workforce has agreed to this because PBF has threatened to shut down the refinery if they are forced to renovate the aging refinery. The result would be the loss of millions in taxes and hundreds of low skill, high pay jobs.

6. How have big media outlets and environmental organizations covered environmental problems related to worse case scenarios in this setting? [HAZEN O’MALLEY]



Fig 8: Air Board kills regulation of dangerous chemicals. Fig 9: Exxon Mobil's outdated equipment led to Torrance explosion

The Los Angeles Times has reported several times on the problems resulting from the refineries in Torrance. At first it was reported on due to an explosion that caused a near-fast disaster scenario. The explosion launched a large piece of equipment into the air and it landed close to a tank of Modified Hydrofluoric Acid (MHF). If the tank had been hit, the chemical would have been released into the nearby community where it would have caused damage and had the capability to “immediately penetrate the skin and destroy tissue” (Penn 2017). Interestingly, searching up the chemical modified hydrofluoric acid (MHF) will almost always bring you back to Torrance because of this near-disaster. The LA Times attributes the blast to Exxon Mobile's outdated equipment, which was “non-operational on a recurring basis” (Penn 2017), which raises concern because of how dangerous MHF is. This tragedy could have been completely avoided if they had changed the chemical used for that part of the process to sulfuric acid as suggested by the watchdog SCAQMD and phased it slowly out over a period of 5 years as reported by the Los Angeles CBS.

The environmental group “Sierra Club” brings up Torrance as a near catastrophe primarily to gain support to ban the chemical altogether in Southern California, saying that “MHF is far too dangerous in such a densely populated area” (Dillow and Sattler 2019). Of the many articles that initially are displayed on Google, none of them have anything good to say about MHF. The larger news outlets have also covered the protests and related actions against the companies on the part of local and national groups. The press turned again to the refineries again when flaring at one refinery led to

absurd levels of pollutants and chemicals being released into the air. Overall, the worst-case disasters have been well covered, but there are probably dozens of other problems that have not been brought to the public's attention that still need to be discovered and covered.

Political bias appears to be of little import when it comes to the hard facts which even FOX, a notoriously conservative news service, covered negatively. For example, NPR reported on how ExxonMobil executed "poor safety measures" (Phillips, 2019), which could have produced a domino effect that could easily take the lives of thousands in the Torrance area. Meanwhile, Environmental organizations in Torrance are doing a fantastic job at educating the public on the injustice in the refinery and corporations' actions.

7. What local actions would reduce environmental vulnerability and injustice related to fast disaster in this setting?



Fig 10: Due to the outdated equipment, the Torrance Refinery exploded. Taken from LA Times "Exxon Mobil's outdated equipment and procedures led to Torrance Explosion, Agency Says."

After the 2015 Torrance refinery explosion, the South Coast Air Quality Management District (AQMD) looked to tighten regulation regarding the toxic chemical MHF, modified hydrofluoric acid. The most direct way to protect Torrance against fast disaster relating to modified hydrofluoric acid would be to phase out the chemical completely, and use processes that involve chemicals which don't vaporize in case of a leak, such as sulfuric acid. While the chemical is still dangerous, if a leak occurs sulfuric

acid would stay liquidized and therefore wouldn't endanger as much of a large area. The Los Angeles County Department of Public Health supports a phase-out of MHF completely, because "emergency response systems could be overwhelmed in a larger release" (McNary 2019), or in other words they would not be prepared for a massive leak of the chemical, which could affect hundreds of people in the area.

However, refinery staff claim that it would be too expensive to completely remove MHF. They say "...it could cost them up to \$900 million to convert refineries to new processes... [and] remind policy makers that hundreds of good-paying local jobs could be at stake" (McNary 2019). They instead prefer more safety measures, which would include "heavy water showers to dissolve any escaping chemical cloud, tall barriers to contain a cloud, and backup safety systems like extra power systems to operate water pumps" (McNary 2019).

However, in order for this to be an acceptable way to reduce the risk of a disaster, they have to be able to put these extra safety measures into effect. The blast was caused by the outdated equipment used by the factory, which was "non-operational on a recurring basis" (Penn 2017). Since the refinery is known for its safety hazards, it would be best to have a policy in place that would require facilities with high risk chemicals, especially in areas with a large residential population to undergo safety checks. In addition to this, workers should go through training in order to know what to do in case of a disaster. After the explosion, it was found that "workers did not have proper protocols to ensure safety when deviating from normal operating procedures" (Penn 2017). The state of the refinery before the explosion was extremely vulnerable because of the equipment and the little knowledge that the workers had, and more safety measures will only prevent fast disaster if both of these issues are rectified.

8. What extra-local actions (at state, national or international levels) would reduce environmental vulnerability and injustice related to fast disaster in this setting and similar settings?



Fig 11: Residents in Torrance put signs on their lawns, supporting the ban of MHF.

More federal restrictions on dangerous industrial chemicals and pollutants (especially for complexes that are near residential communities and schools) will greatly help address some of the environmental threats faced in these communities. Currently, the chemical modified hydrofluoric acid (MHF) is only still used by two refineries in California: Torrance, and Wilmington, and it is extremely dangerous because if a leak occurs then the chemical vaporizes, it can cause severe injury or even death. A safer alternative exists, sulfuric acid, which would eliminate the threat of a cloud of lethal gas escaping. According to the LA times, the South Coast Air quality management district governing board voted to adopt the refineries' plan to improve safety feature in the coming years, instead of eliminating the use of MHF and the threat of a horrific worst-case scenario entirely (Barboza 2019). This can be overridden by a federal ban of MHF.

It is also known that the company that runs the Torrance refinery, PBF, has been engaged in lobbying after a ban on MHF was proposed. According to the Daily Breeze, "The owner of the Torrance refinery spent more than \$600,000 on lobbying last year, more than three times as much as it spent in 2016" (Green 2018). PBF paid politicians to vote against a ban of MHF, and the company succeeded. Rather than have chemical bans based on the votes of politicians who may or may not be biased, they should instead be based on how dangerous the chemical can be and how quickly it can be

spread.

9. What kinds of data and research would be useful in efforts to characterize and address environmental threats (related to fast disaster, pollution and climate change) in this setting and similar settings?



Fig 12: Exxon Mobil Refinery

Even though it is fairly well known that the chemicals like those used in places like the Torrance Refinery can have adverse effects on the human body; there has been surprisingly little research into the communities surrounding these industrial sites who are exposed to these chemicals every day. As we saw in films like *Homo Toxicus* and *Chemical Valley*, these communities are a prime example of the environmental threats posed by industrial pollution; with problems with respiratory problems and birth defects being passed down through generations. The more data that can be gathered on these communities and the chemicals that they have been exposed to the harder it will become to deny that there is a serious problem with industrial pollution. In addition to this the research already done on these chemicals as well as their safety data sheets should be made public to those who live in the area and to anyone who is considering a move there. The more well informed the public is on these potential hazards the easier it will become to reduce environmental injustice in these communities. Lastly, there

should be an increase in research into cleaner and more efficient methods of power and fuel production; as this will have a huge impact on emissions that we are releasing into the atmosphere. There has already been tremendous progress in this field, for example a power plant that opened in Texas in 2017 is capable of capturing 90% of its CO2 emissions (KOSSAKOVSKI 2017). The problem with these technologies is that they are currently very expensive to construct; but the more research that is done on them and the materials they require, the more feasible it will become to greatly reduce our impact on the environment as a whole.

10. What, in your view, is ethically wrong or unjust in this case?
[Parmida]

In our views, Torrance's refinery is extremely unjust to the people of Torrance. In 2015, there was an Exxon Mobil plant explosion and investigation into the incident has shown that many of the safety procedures were outdated and inadequate for running the plant, and that the workers were essentially running the plant blind up until the explosion (Ivan Penn, 2017). This shows that the company not only disregarded the safety of its workers but also the safety of the people of Torrance CA. Although the explosion resulted in no casualties and only minor injuries to a few of the refinery employees, it had the potential to be extremely catastrophic by releasing hydrofluoric acid that was stored at the complex into the nearby area. And even though a new company, PBF Energy, has taken over the refinery, there seems to be no improvement in safety regulations at the refinery as there has been multiple leaks and fires in the subsequent years. People would have thought that after this incident there would be a release of proper and accurate information about the danger the refinery poses to them in case of a worst-case scenario, but they were wrong. According to Dr. Sally Hayati, the EPA risk zones grossly underestimate the number of people which could be affected by a worst-case scenario. (Torrance Refinery Action Alliance, 2019). The zones that Dr. Sally Hayati generates rely on the fact that the "modified hydrofluoric acid" used in the Torrance refinery is still 93% to 94% Hydrofluoric acid. and therefore, would behave very similarly to a cloud of HF (Torrance Refinery Action Alliance, 2019). There is a very large population of people who reside beyond the EPA risk zones but still may be threatened by a worst-case scenario, and because these people fall outside of the EPA risk zones, they may be unaware of the danger they are in. One of the high risks that they can be in is from the odor and the smoke of the refinery. The refineries are far too close to the residences of Torrance. Even if accidents do not happen, fumes are always released, and those inhaling it are the high school students at North high, the young

children at Columbia Regional Park, and families living at their home. It is even been reported that residents have reported awful smells coming from the factory. Yet, city officials claim there were no harmful pollution readings were taken (Mazza 2017). However, not all toxic chemicals have odor. Harmful odorless chemicals such as carbon monoxide in large sums can much kill someone instantly as they inhale it continuously. However, carbon monoxide is one of the many toxic chemicals that are odorless and dangerous. As of now the community of Torrance is defenseless to any refinery accident, and it will be with time and even maybe death till the city realizes that it is unjust to have a refinery right across the street from a residential community.



Fig 13: The ExxonMobil refinery explosion in the city of Torrance, February 28, 2015.

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APPENDIX

STAKEHOLDER SKETCH		
catalysts	"stakeholders"	corrosions
Support from local organizers	Community members	Status, Race, lack of education, and funding from the local refineries
Empathy from community	Students	Lack of organization
Financial gain from refinery	Exxon-Mobil shareholders	Explosion in 2015
Donations, collaborations with multiple activist groups	South Bay 350 LA	Restricted by the need for government action in a lot of cases
Money, funding for local programs,	Torrance Refining Company	Concern over MHF,
National Protest Programs, Petitions, Legal Action	Community for a Better Environment (CBE)	Higher level national organization, less involved
Local community organizing & protests, voting control	STAND - LA	Lack of popularity/Support, lack of money
Strong national presence	The Sierra Club	Not active locally
Money, community organizing, Older,	North Torrance Community center	Time (the majority of people here are old, they on their way out).
Money, more funds by	Tesoro/ Andeavor refinery	Carson refinery thinks it is

merging between Carson and wilmington. Right next to torrance. Might affect them too..		too risky. But was closed on oct 1.
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CHOOSING A COMMUNITY SKETCH		
Resources: <u>Who's in Danger? /// California Fact Sheet /// CalEnviroScreen 3.0</u>		
Questions to Consider:	Community 1: TORRANCE	Community 2: LONG BEACH
<i>Does the community's Wikipedia page give any clues to worse case scenarios? Are there hazardous industries? (Look in the economy section)</i>	As a major oil-producing region, Torrance was once dotted with thousands of oil wells and oil derricks. Though the oil wells are not as common as they once were, the Torrance Refinery Oil refinery owned by PBF Energy in the north end of the city is responsible for much of Southern California's gasoline supply. Torrance was also an important hub and shop site of the Pacific Electric Railway.	The Long Beach Oil Field is a large oil field underneath the cities of Long Beach and Signal Hill, California. The Ford Motor Company built a factory called Long Beach Assembly where the factory began building the Ford Model A. Production of Ford vehicles continued after the war until 1960 when the plant was closed due to a fire, and January 1991 when the factory was demolished partially due to air quality remediation efforts.
<i>Are there local environmental groups in this</i>	<u>Link</u> ; Communities for a Better Environment, East	<u>Link</u> ; Long Beach against Fracking, East Yard

<i>community? (Possible search term: environmental justice)</i>	Yard Communities for Environmental Justice, STAND-LA, CFASE, FLARE, etc.	Communities for Environmental Justice, STAND-LA, CFASE, FLARE, etc.
<i>According to the EPA, is this location likely to be in at least 1 RMP vulnerability zone?</i>	Yes	Yes
<i>What is the RMP potential in EPA EJ Screen?</i>	91 percentile	90th percentile
<i>Is the community listed in either of these resources? <u>Who's in Danger?</u> (starting on page 59) /// <u>California Fact Sheet</u></i>	Yes	Yes
<i>According to the American Lung Association, is the community's <u>state of air rating?</u></i>	(F) Fail	(F) Fail
Chosen community: Torrance		

COMMUNITY FAST FACTS SKETCH	
Fast Disaster Community: Torrance	
Google Search	News Resources
Fast Facts: Torrance used to be “dotted with thousands of oil wells” (10FA)	Links: https://en.wikipedia.org/wiki/Torrance_California#Economy

<p>Major Industries: US Honda, Exxon-Mobil, Honda R&D, Honeywell Aerospace, Robinson Helicopter Corp, Arconic, etc.</p>	<p>http://www.10-facts-about.com/Torrance/id/312</p>
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ABOUT THE AUTHORS

BIOGRAPHICAL STATEMENTS

Eric Green is an undergraduate at the University of California Studying Biological Sciences. Through studying his major, he has understood biologically how all life reacts to certain stimulus and environments. On top of that through the chemistry background studying biology, he has also understood chemically how inorganic and some organic chemicals pose a threat to the human body and its overall being. Through his studies he hopes to pursue a field in epidemiology to help educate communities how our bodies react to certain environments and toxins.

PHOTOS



Parmida behmardi is a 4th year at the University of California, Irvine student in Psychological science major. Her goal is to become an Art therapist to be able to help children that have been hurt badly. She believes that physical wounds might heal but the individual is not truly healed till the mind heals too. She has also been interested in nature and the environment and she is looking into ways that she can help this environment crisis. She believes that even one person can make a difference.



Hazen O'Malley is a 2nd year Civil Engineering Major at the University of California Irvine. He is interested in art, the environment, and working to help communities in need. He believes that we need to come together and work towards a brighter future with green engineering, design, and forward thinking.



Regan Galinato is a 1st year Environmental Engineering Major student at University of California, Irvine. She is interested in issues involving climate change, pollution, and water sources, and believes that humans must work hard to overcome future environmental problems that stem from these issues.

